

The DWR-MWQI Real-Time Data and Forecasting Program (RTDF)

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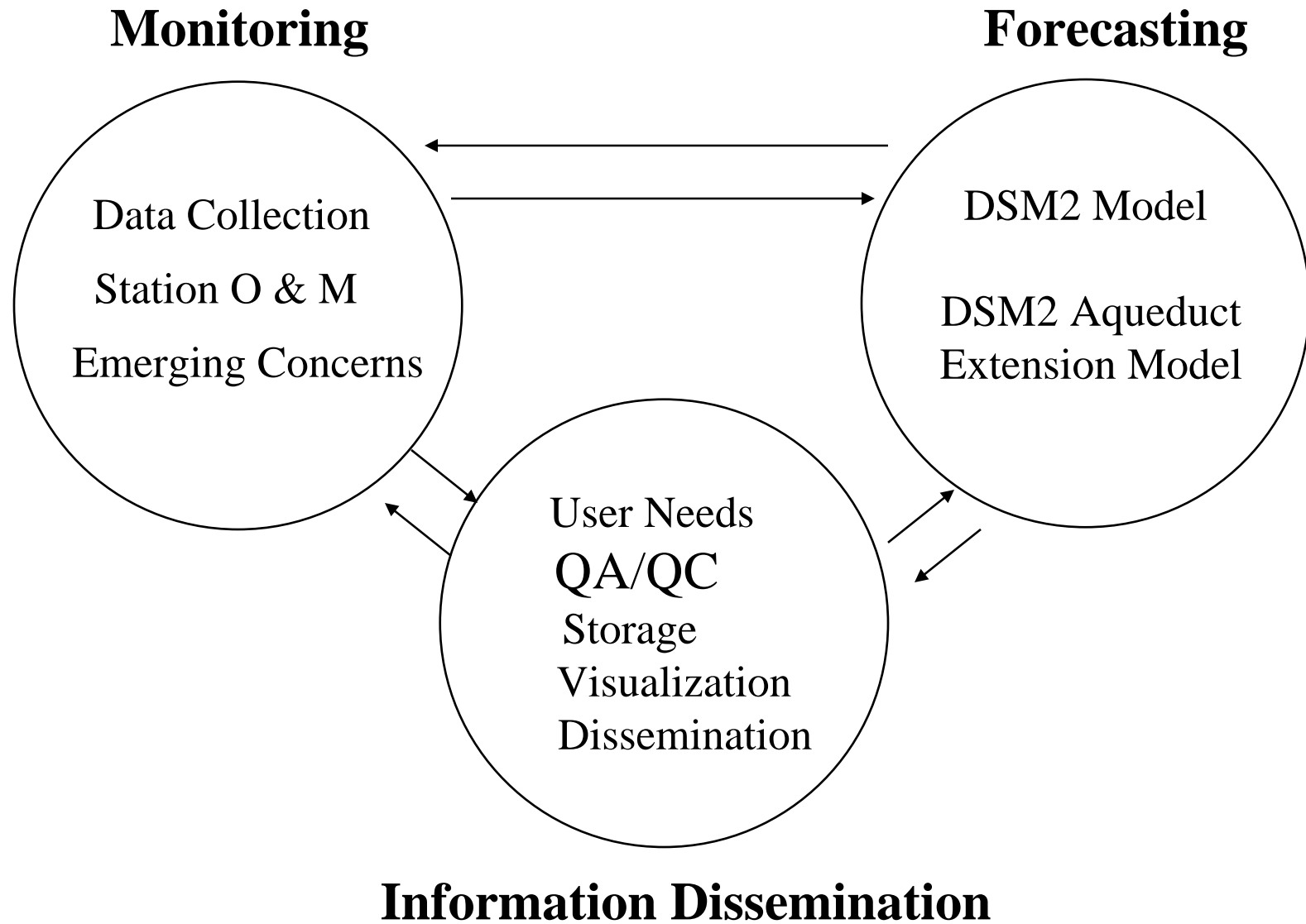
***SJRMP
17 May 2006***



RTDF Project Goal

To provide data and information to source water and system managers, municipal treatment plant operators, researchers, and stakeholders to optimize and balance resource use, promote science-based decision making, and economic efficiency.

RTDF: Three Components





Serve it Up: RTDF Project Design

- *Identify Customer Needs & Purposes*
- *Develop Tools and Processes to meet them*
- *Recognize Valuable Products as Resources*
- *Have a Feedback Process*

Design Results:

Innovative uses of information

RTDF provides an “early-warning system” for:

- *Source Water Managers*
- *State and Federal Project Operators*
- *Treatment Plant Operators*

Sources and Loads information for:

- *Scientists*
- *CALFED*

Other Interests:

- *Agriculture, Power generation, etc.*

Assessing Sources and Loads

- *Loading Information From Various Land Uses*
- *Determine Sampling Locations to Fill in the Information Gaps*
- *Model Development for Transport to and Load at Intakes.*

Assessing Sources and Loads

- *Monitor and Model Transport of Contaminants from Different Sources*
- *Determine Priority Sources for Watershed Protection Efforts*
- *Apply Information to Regulatory Processes or Control Efforts*

RTDF: Monitoring

DWR's Vernalis station



Purposes for Water Quality Monitoring Data

- *Regulatory Compliance*
- *Research*
- *Baseline or Historical Record*
- *Source Water Protection*
- *Determine Sources and Loads*
- *Information to Customers*

RTDF Monitoring Stations

- *Three boundary stations established*
 - *Sacramento River at Hood*
 - *San Joaquin River near Vernalis*
 - *H.O. Banks Pumping plant*
- *DOC, TOC, salinity, measured – all stations*
- *Bromide, Chloride, Nitrate, Sulfate –
Vernalis and Banks Stations*

RTDF Monitoring Stations



Hood
Sacramento River

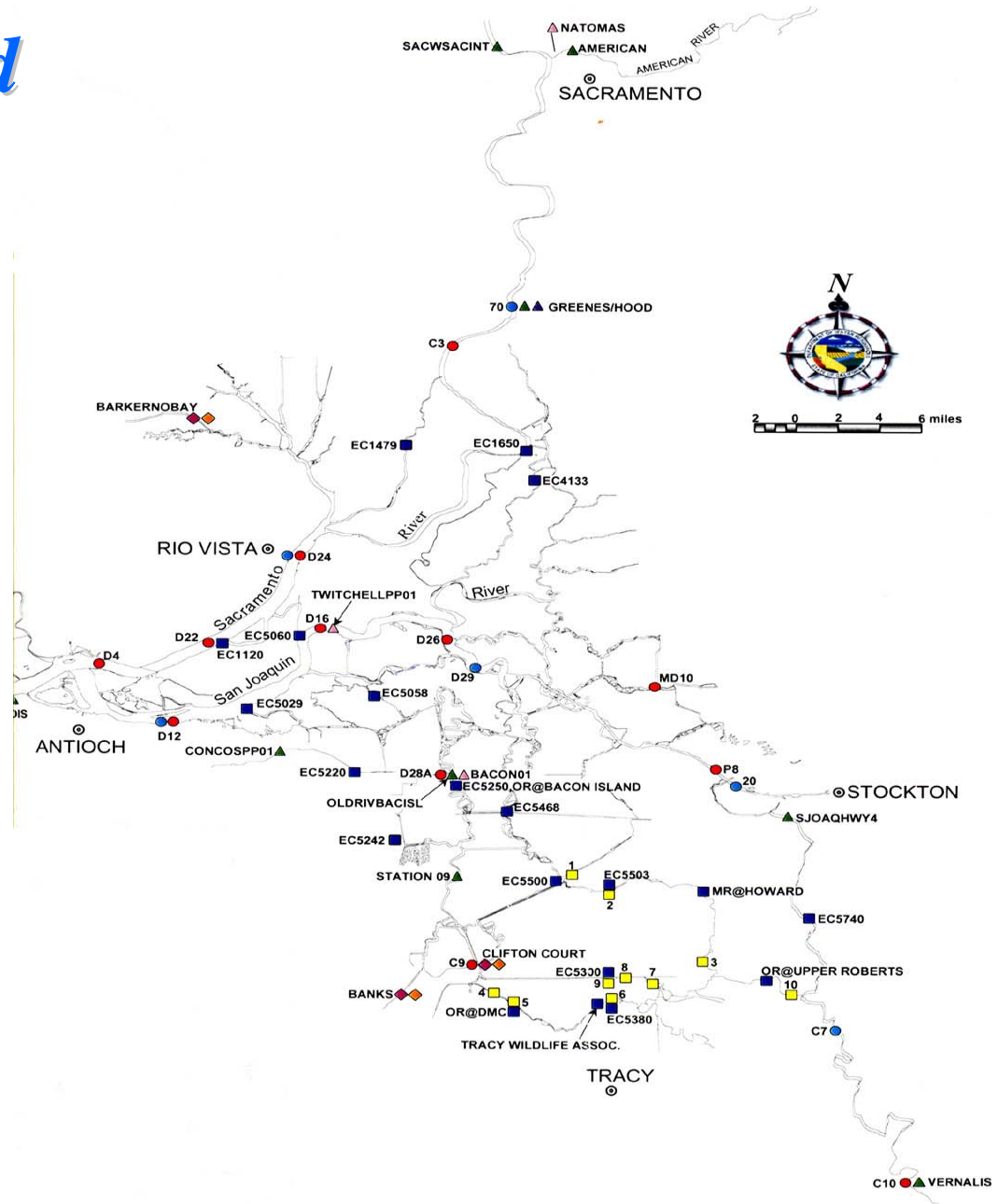


H.O. Banks
Aqueduct

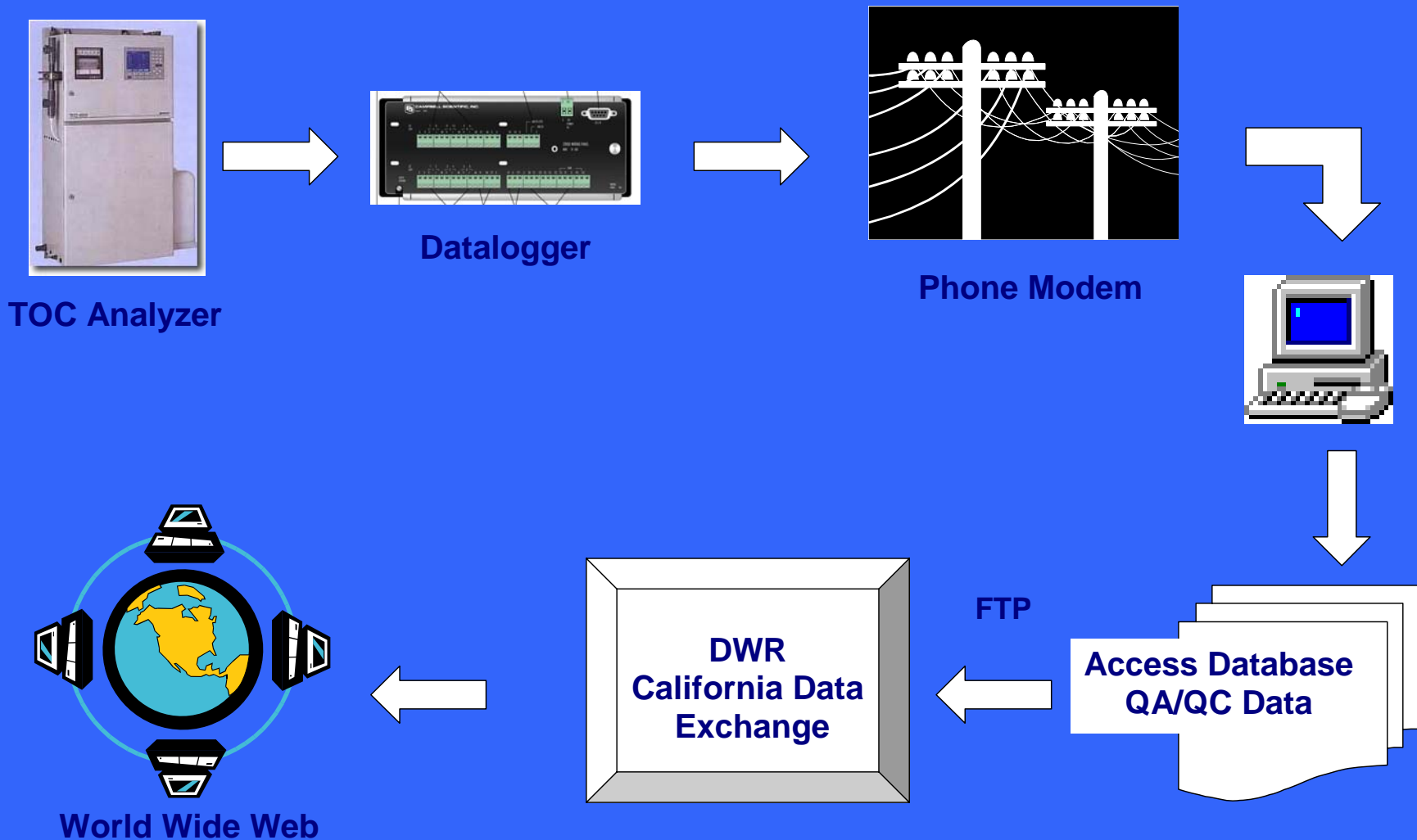


Vernalis
San Joaquin River

DWR Discreet and Continuous Monitoring Sites



Real-time Data System



TOC/DOC and Anion Analyzers



**Shimadzu
model 4100**

(@ Banks and Hood Stations)



**Sievers
model 800**

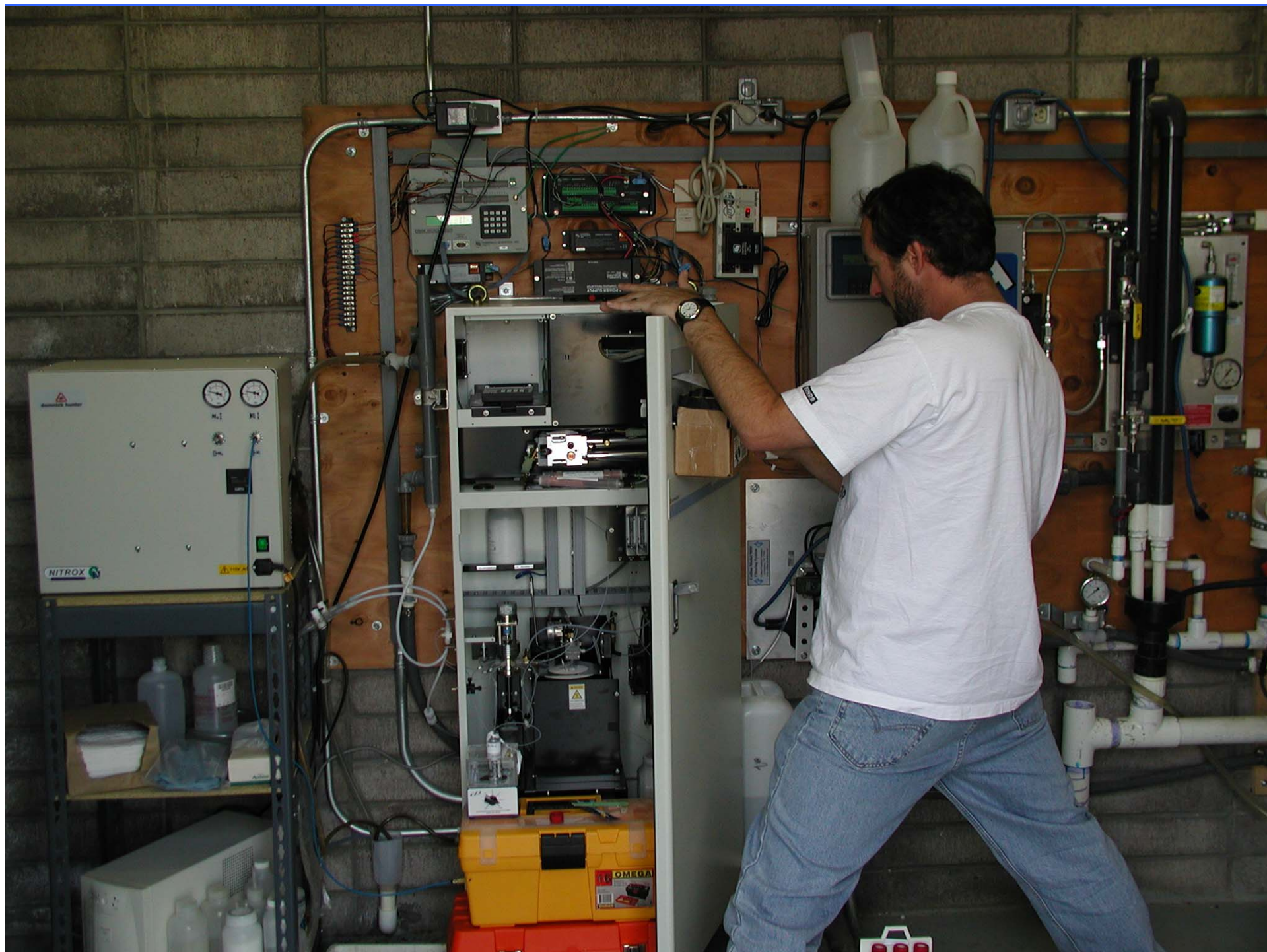
(@ Hood Station)



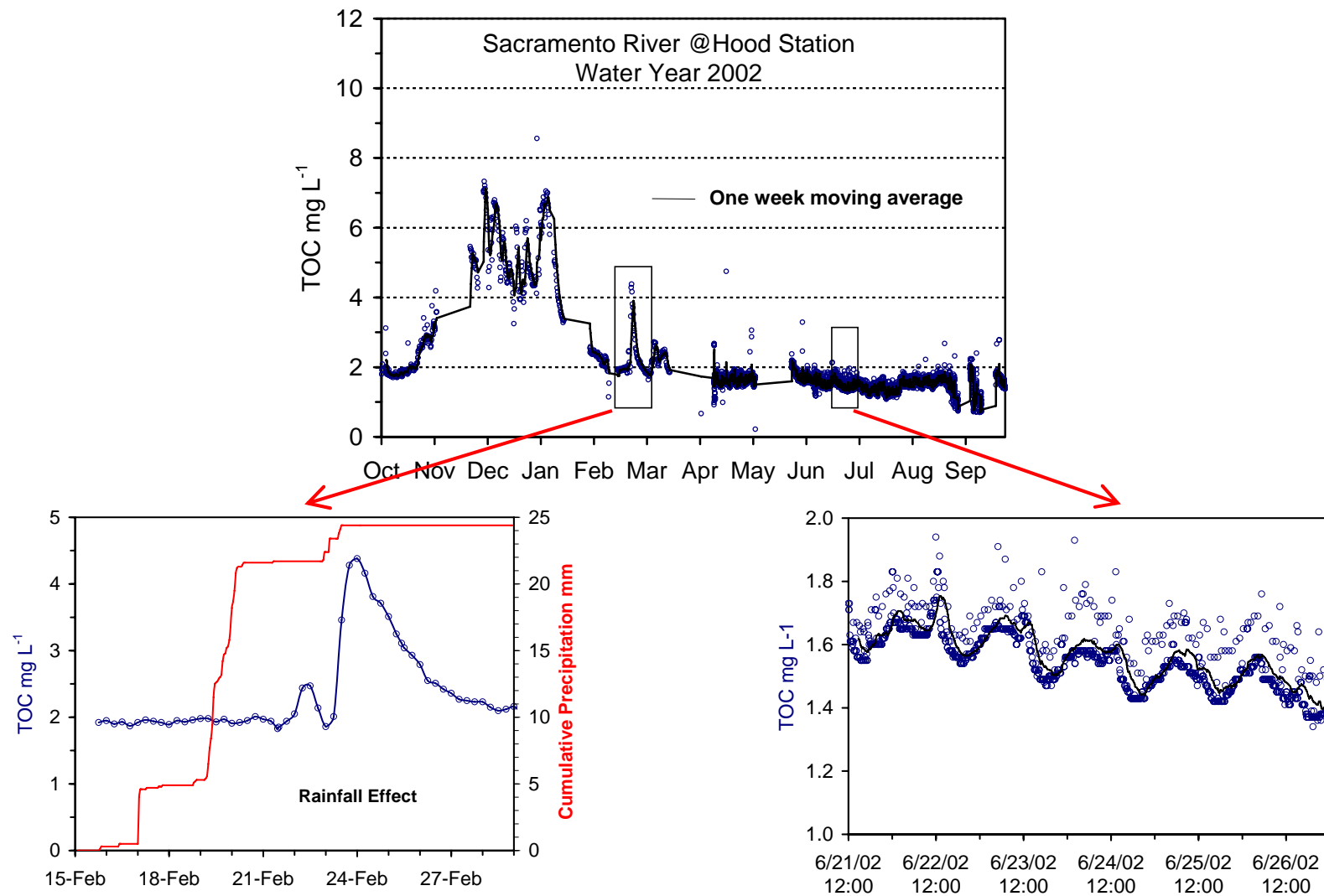
**Dionex
model 800**

(@ Banks and Vernalis Stations)

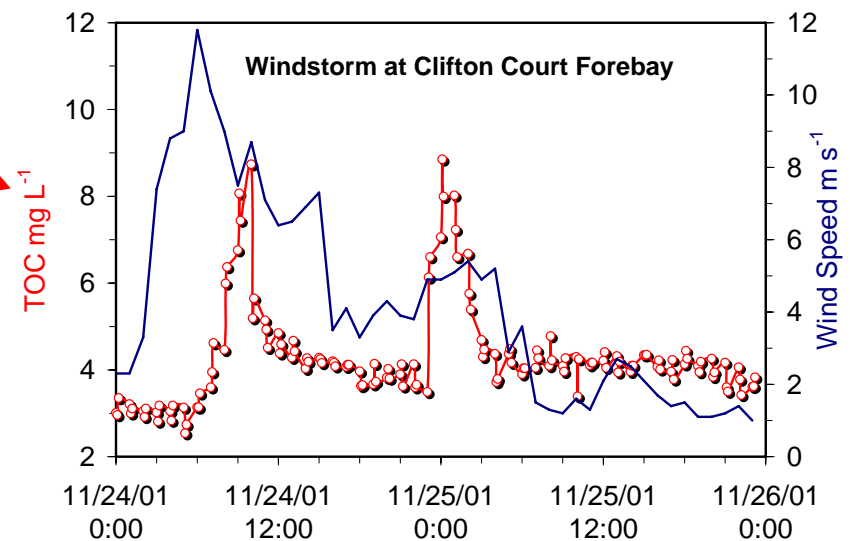
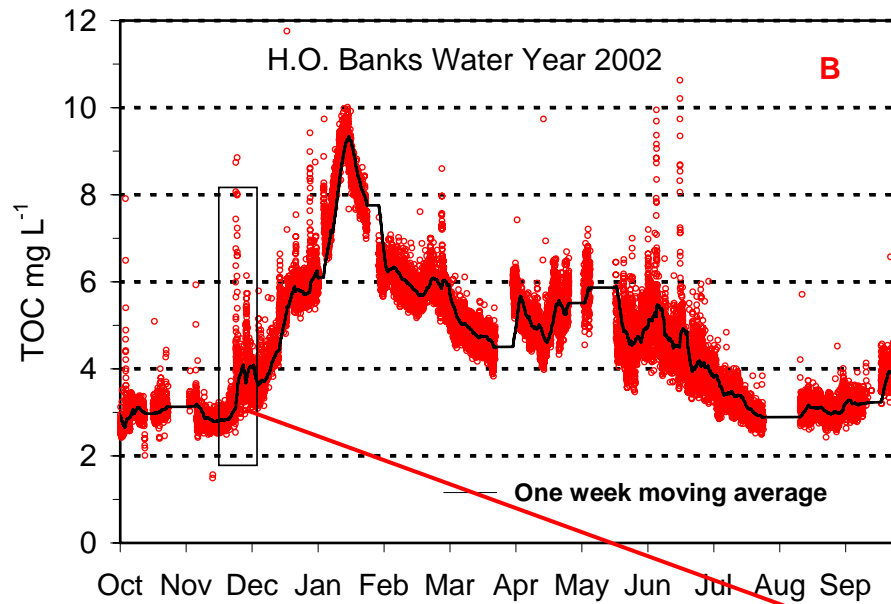
Measurement Type	NPOC (acidify/sparge removal of IC)	TOC (TC - IC)	Anion (Bromide, Chloride, Nitrate, Sulfate)
Measurement Principle	Catalytically aided combustion with NDIR detection	UV/persulfate oxidation with membrane/conductivity detection	Ion Chromatography
Range	0 - 1000 mg L ⁻¹	0.05 – 50,000 µg L ⁻¹	N/A
System Price	\$30,000	\$25,000	\$100,000



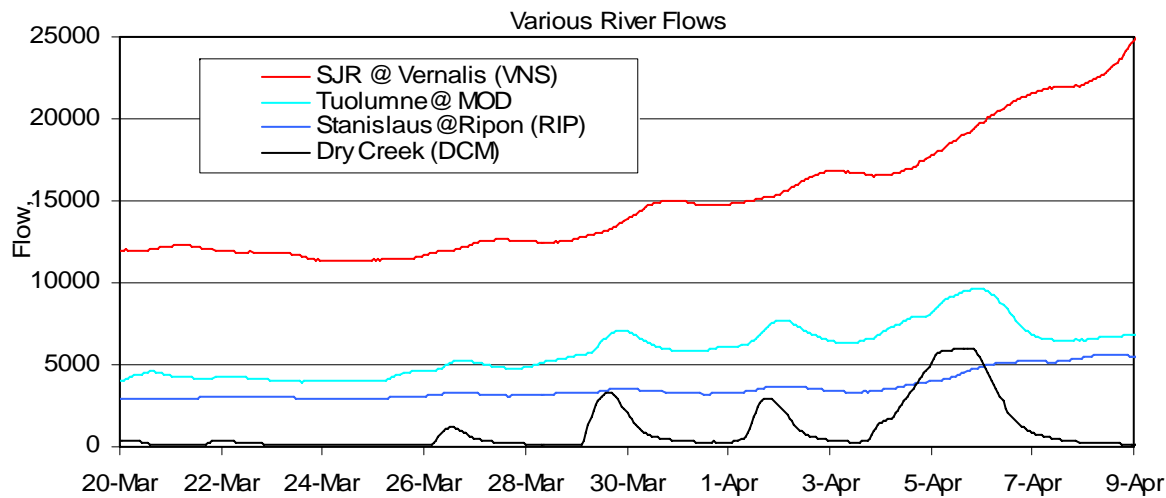
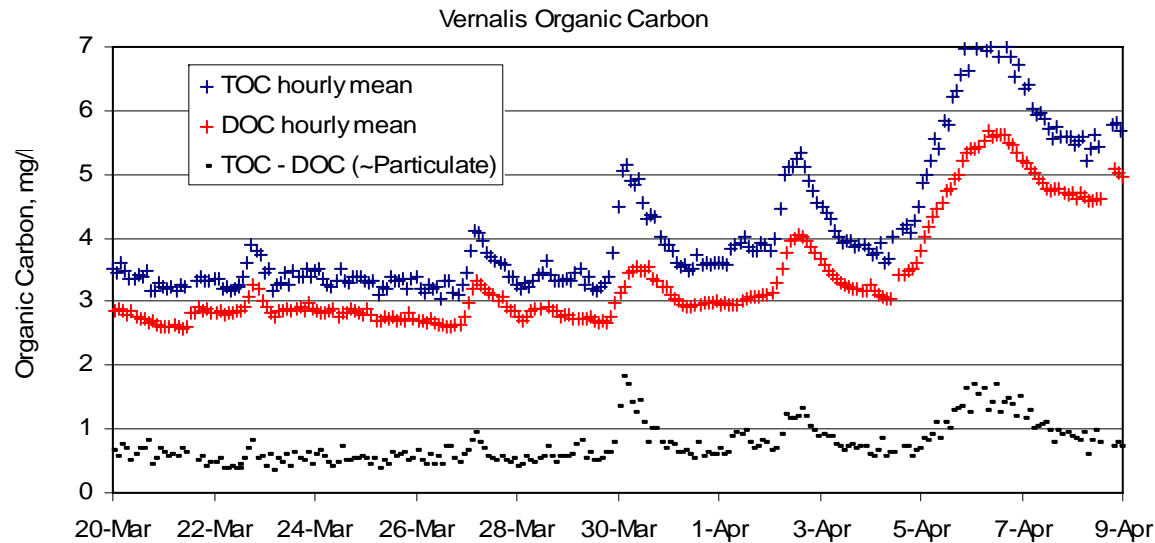
Example: Scales of Variation in Data at Sacramento River



Using High-Frequency Data at the SWP Banks Pumping Plant



High-Frequency Data at Vernalis

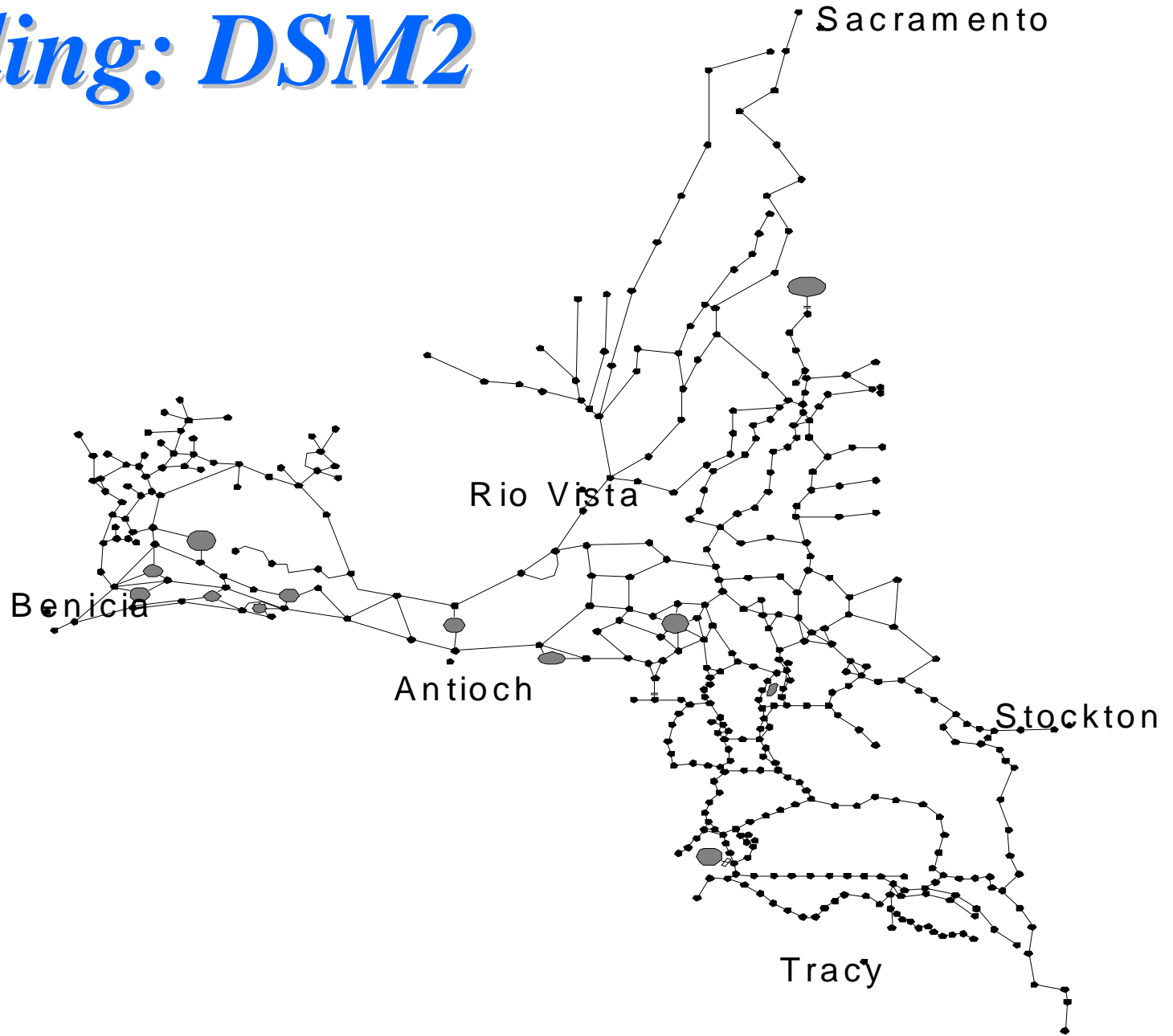


CDEC Data at Vernalis

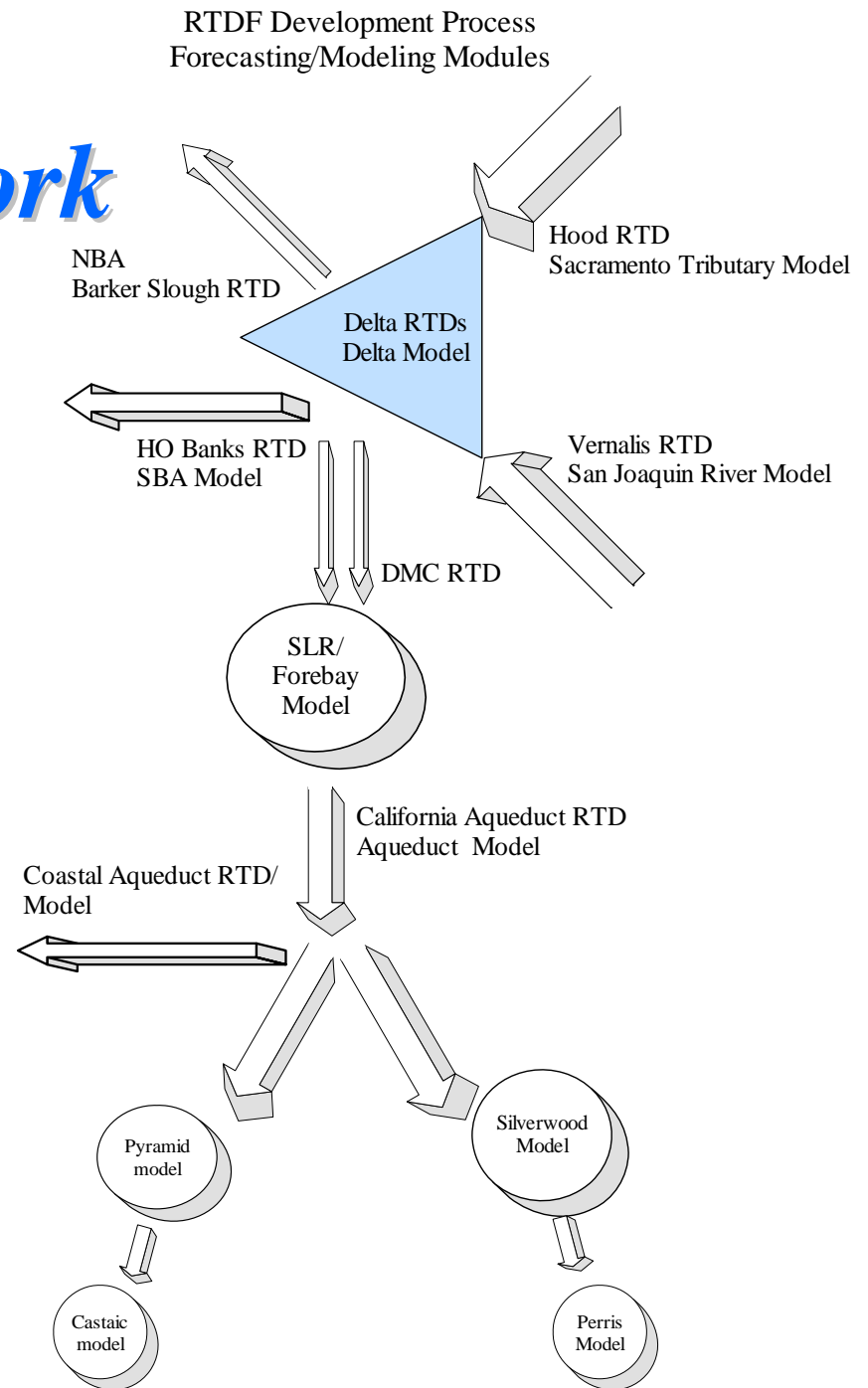
River	Flow, cfs	EC, uS/cm	EC x Flow	% Flow	% Load
Salt Slough SSH	1370	1030	1411100	4.0%	21.0%
Mud Slough MSG	700	4660	3262000	2.1%	48.5%
San Juaquin nr Stevenson SJS	13700	88	1205600	40.2%	17.9%
Tuolumne at MOD	8030	36	289080	23.5%	4.3%
Merced at CRS	4140	60	248400	14.7%	3.7%
Merced at MST	5000				
Stanislaus at Ripon (RPN,RIP)	5300	59	312700	15.5%	4.6%
Total	34100		6728880	100%	100%
Vernalis	31200	100			

Mud and Salt Sloughs contribute 69% of the "EC load", but only 6.1% of the water
 SJR at Stevenson and Tuolumne provide 64% of the flow, but 22% of the "EC load"

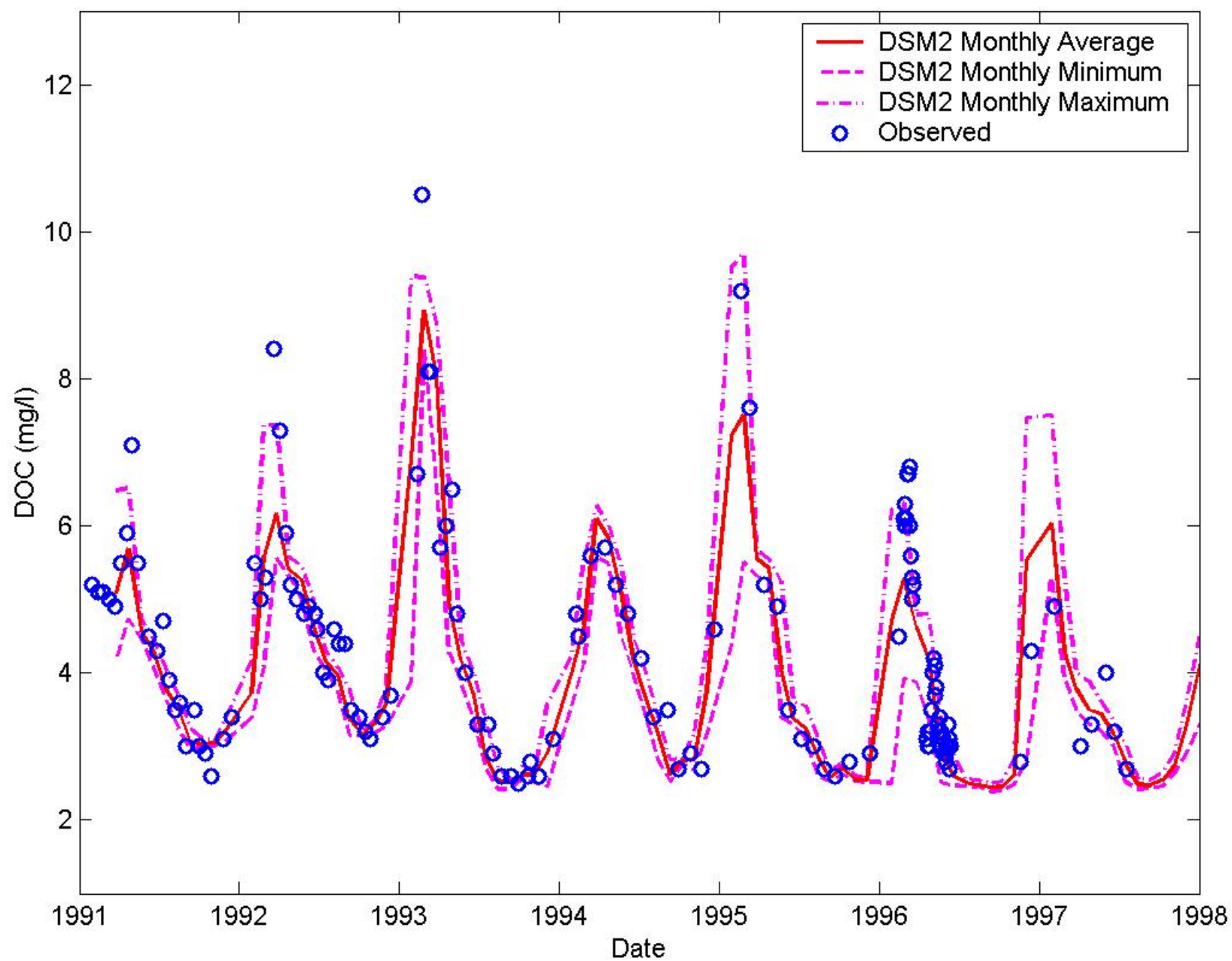
Modeling: DSM2



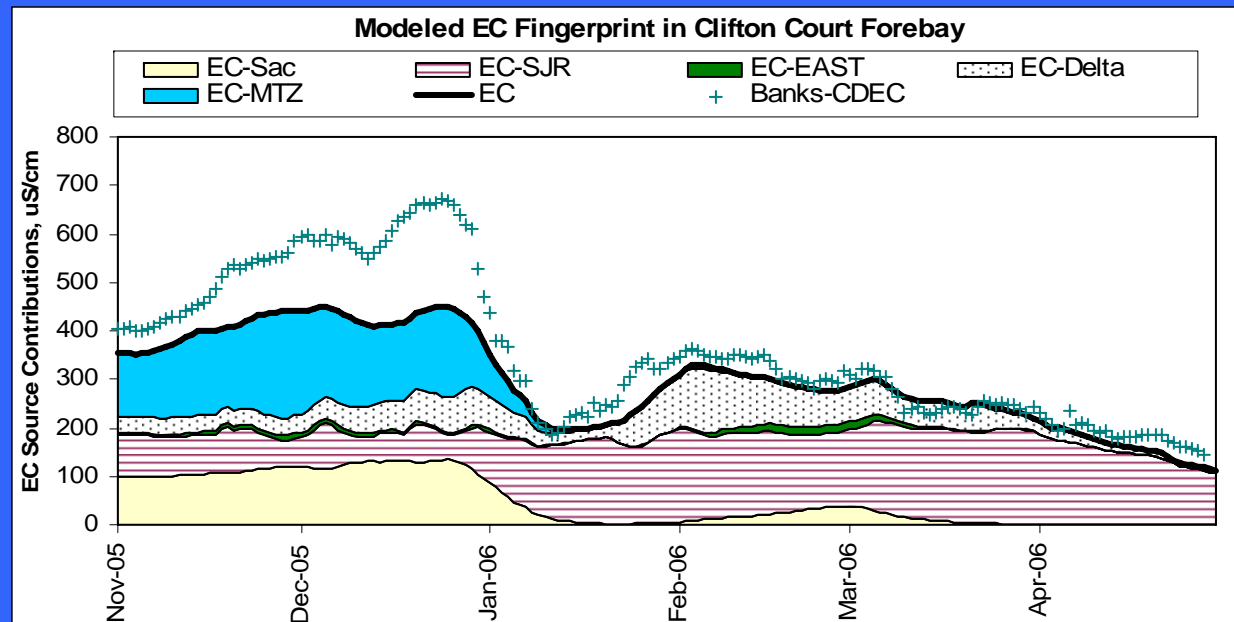
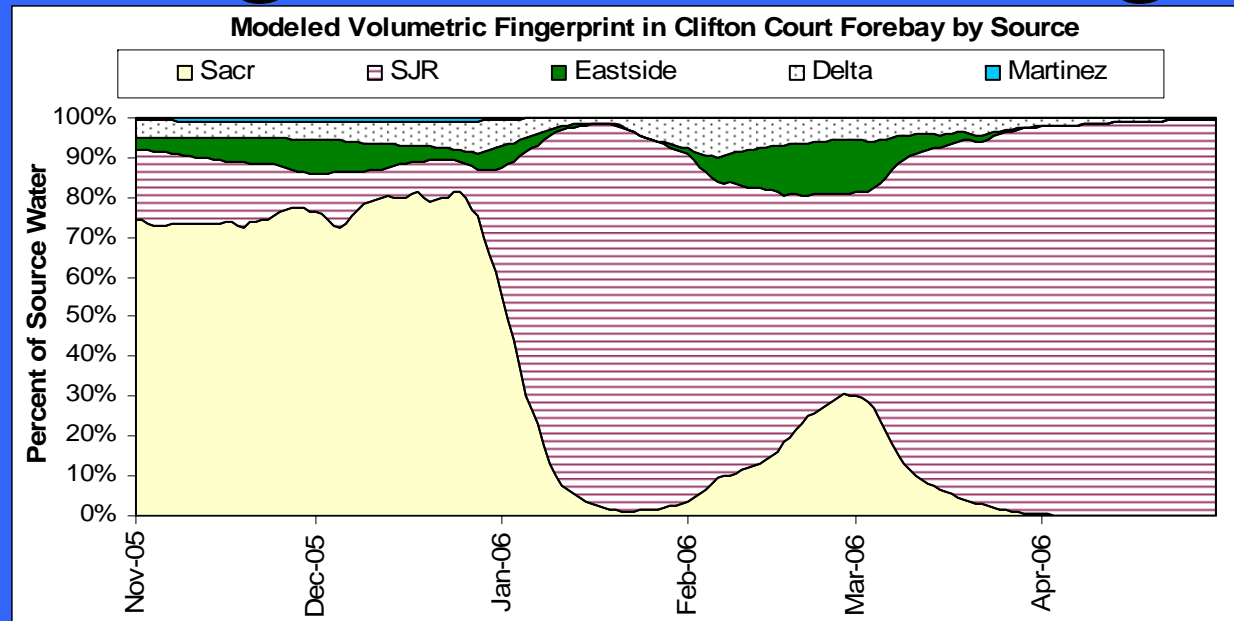
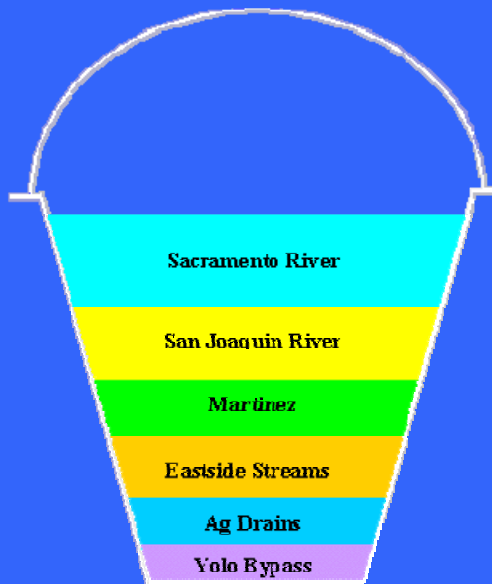
Modeling: Part of a larger network



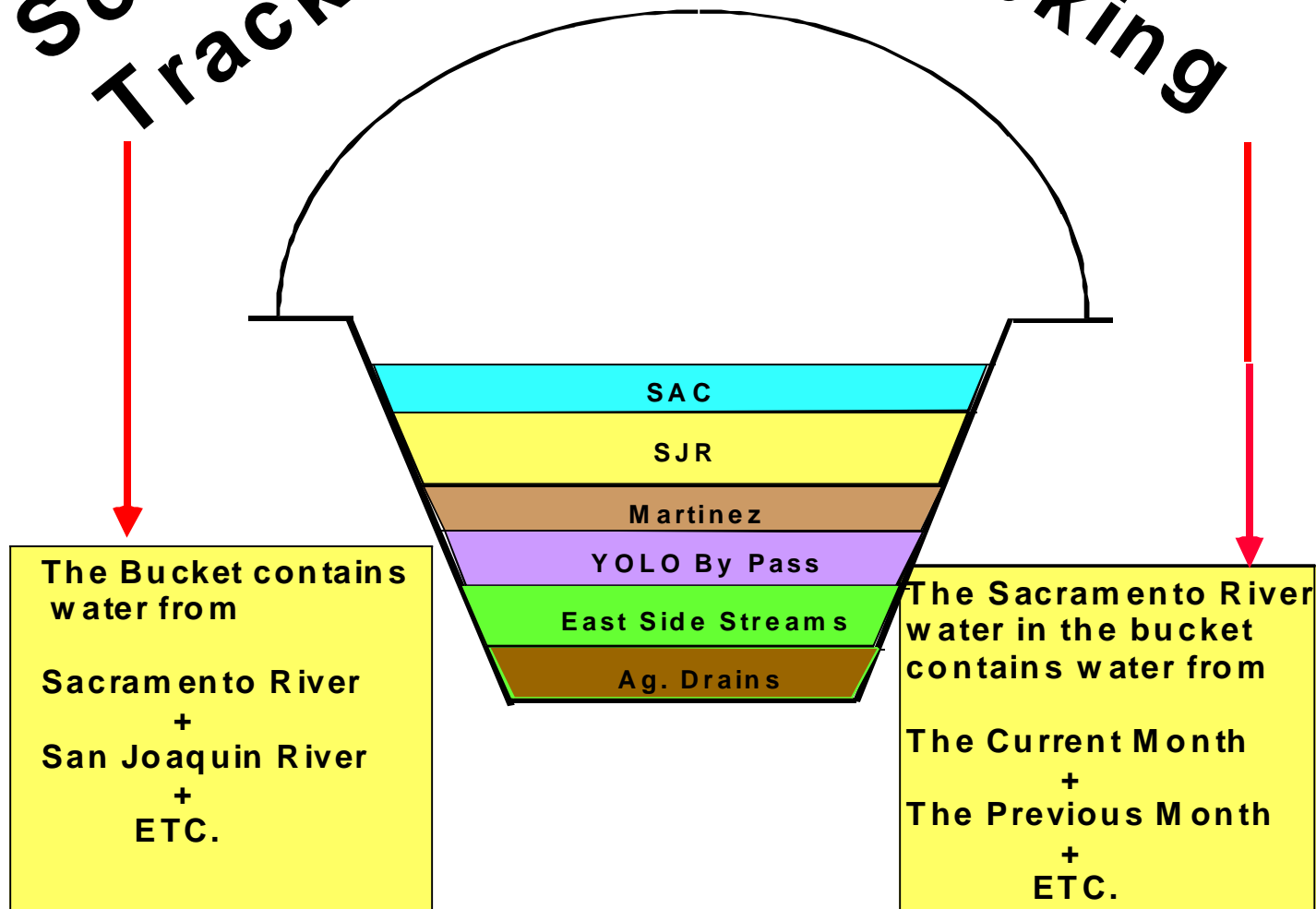
Dissolved Organic Carbon at Banks Pumping Plant
Observed Grab Samples vs DSM2 Predicted Values



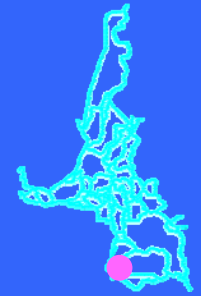
Modeling: Source Tracking



Source Tracking and Time Tracking

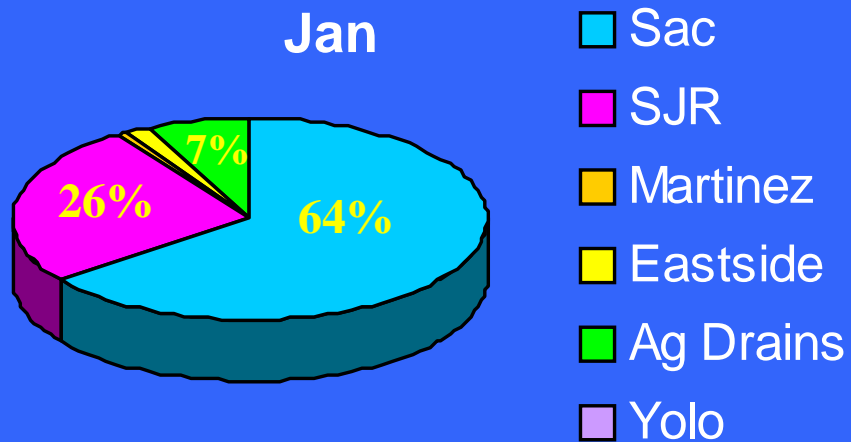


Flow Contributions at Clifton Court



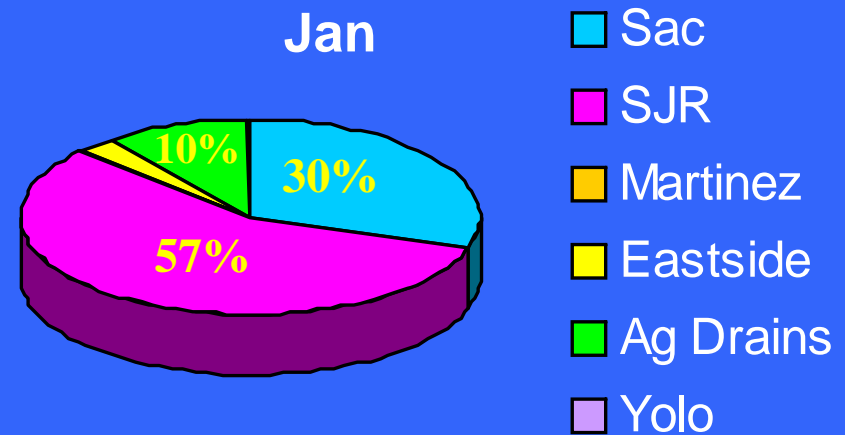
Critical Years

Jan



Wet Years

Jan



Information Dissemination



Information Dissemination: Goals & Guides

- *Must meet user needs ... which will change*
- *QA/QC and data management procedures especially important w/ large, real-time data sets*
- *Data visualization & presentation important to reach a variety of users*
- *Create & foster feedback*

Information Dissemination: Products

- *A weekly report & data set for the Delta, SWP and CVP e-mailed to about 200 subscribers.*
- *In the near future, a continuously updated website where users can access historical, real-time and forecasted data and information.*
- *A long-term data management system for storing & browsing real-time data*

Information Dissemination: RTDF's relationship to CDEC

- *RTDF and CDEC are collaborating, but independent*
- *RTDF Data are sent to CDEC, but RTDF QA/QC is (will be) more robust*
- *Internal management of RTDF-type programs works best*

RTDF Program Expanding

- *Additional forecasting tools being developed, e.g. DSM2 Aqueduct expansion model*
- *Integration of monitoring, modeling and dissemination are being improved*

RTDF: Next Steps

More complex monitoring and modeling efforts

- *Anions: Integrate anion data into RTDF*
- *Nutrient dynamics: Ion analyzer can quantify nitrate, orthophosphate*
- *Develop pigment-specific chlorophyll monitoring and dissemination capabilities*
- *Dissolved oxygen dynamics*
- *Investigate monitoring of non-conserved, more “biological”, processes*

MWQI's Mission

Working closely with urban State Water Contractors and other users of Delta water our mission is to assist in the monitoring, protection, and improvement of drinking water quality of Delta water delivered to these various users and to disseminate data to all users in a timely manner.